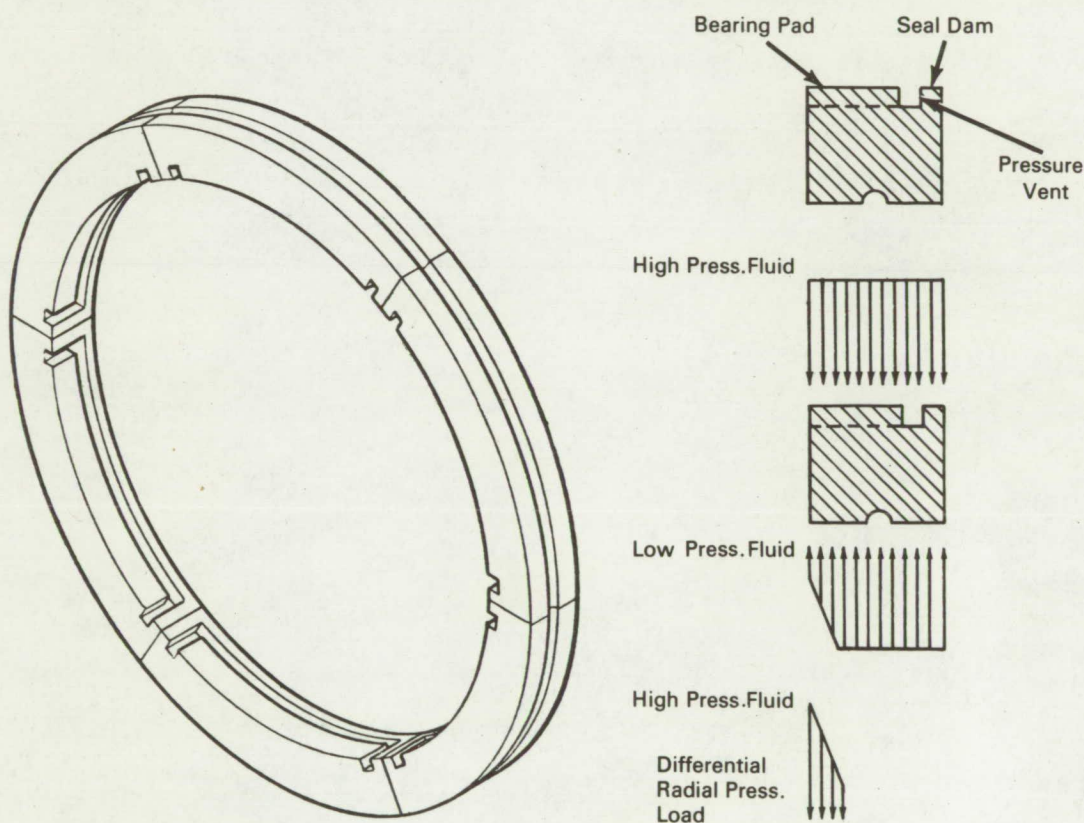


# NASA TECH BRIEF



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## Segmented, Arch-Bound Carbon Seal Is Pressure Loaded



### The problem:

To design a positive seal with a low leakage rate and minimum loading requirements for a high pressure, large diameter fluid impeller shaft with large axial and radial movements. Conventional segmented carbon seals at high speeds and high pressures suffer from excessive loading, heat generation, and power losses.

### The solution:

A conventional segmented carbon seal, modified to cause the segments to become arch-bound at a diameter slightly larger than the rotating element o.d. so that a portion of the load is carried in hoop stress.

### How it's done:

An impeller seal having a leakage rate 1/30th of conventional metal labyrinth seals and 1/10th of

(continued overleaf)

recently developed close clearance plastic seals, is obtained by modifying a conventional segmented carbon seal. The modification causes the segments to become arch-bound at a diameter slightly greater than the shaft o.d. and uses the differential pressure on the seal dam at the rubbing surface by supporting a portion of the differential loading in hoop stress.

**Note:**

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B67-10325

**Patent status:**

No patent action is contemplated by NASA.

Source: R. E. Burcham  
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